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THE SOCIAL IMPACTS OF WATER IMPOUNDMENT PROJECTS: A SYNTHESIS OF RESEARCH FINDINGS

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Introduction

Some of the most significant contributions made by social scientists to natural resources research in the last decade have been in the field of social impact assessment. While this form of evaluation research is relatively new to environmental issues, the genesis of social impact research can be traced to early sociological studies conducted in Europe which were focused on the evaluation of the social consequences of institutionalization. The major impetus for contemporary social impact research in the U.S., however, came from the environmental movement [11,18,19] in the late 1960's which culminated in the enactment of the National Environmental Policy Act of 1969 (NEPA). NEPA basically mandates that all federally funded projects which have the potential to disrupt existing environments are subject to close examination to avoid adverse consequences. The legislation requires all federal agencies engaged in disruptive development programs to prepare an environmental impact statement (EIS) which documents the potential impacts of each project. Initially the EIS was perceived to be confined to the assessment of the project impacts on the physical environment but later interpretations of NEPA expanded the scope of the EIS to include economic and sociological phenomena. Subsequently, a social impact assessment (SIA) is now required to fulfill the intent of the legislative action.

Since many development programs were in process when NEPA was enacted, federal agencies were suddenly required to justify their projects using different criteria. To fulfill the mandate for EIS's and SIA's, agencies

appropriated considerable economic resources for use in evaluative research. Many social scientists from universities and private consulting firms throughout the U.S. were attracted by the SIA funding and began to initiate research programs. Soon great numbers of SIA's were being produced but many of the research efforts were quite poor and contributed very little to decision-making and even less to professional understanding of social processes involved in natural resources development. There were many reasons why the studies were not very good but most of the contributing factors can be subsumed under two broad categories: 1) ineptness of the researchers, and 2) the embryonic state of the knowledge base in the field.

A considerable number of "social scientists" engaged in SIA research during the early 1970's were not well trained in research methodologies which could be used for making projections about future impacts and few knew anything about the potential adverse social consequences of planned environmental change. Quite often it appeared the SIA researchers were more concerned about satisfying contractual agreements than producing useful information for decision-making. The situation is not much better today and even a cursory examination of numerous SIA reports produced under contractual arrangements in recent years show that few of the studies have been guided by theoretical perspectives and are very descriptive in nature. Often times critical social and psychosocial factors are ignored since the sponsoring agency does not wish to examine "sensitive" issues.

The intellectual chaos which existed in social impact research for several years was undoubtedly a partial function of the lack of research precedents and substantive knowledge bases in the field, but the authors of this paper are convinced that many of the relatively useless documents

produced under the guise of SIA research were the product of ineptness on the part of the researchers and the inability of the sponsors to provide direction relative to what was needed in the planning process. Also, the sponsors often were not motivated to produce good SIA's because they were simply complying with mandates. SIA's were often perceived by agency personnel as being an additional component of the legislative maze through which the agency was required to pass prior to reaching the implementation phase of the project. Agency personnel wished to comply as quickly and as easily as possible with the legislative mandate and proceed to implement their programs. Such attitudes contributed to poor research output.

As a result of these and other factors, the state-of-the-art in SIA research is not as far advanced as it should have been given the extensive human and economic resources which have been allocated to such research efforts. This does not mean that progress has not been made in the field because some research efforts have contributed to our knowledge base and the purpose of this chapter is to examine some of the social science contributions made to SIA research in the last 15 years. The focus of the chapter is exclusively on the social impacts of water impoundments since it would be impossible to examine the research literature for all natural resources development programs in the space allocated for discussion. The concepts and content specific materials discussed in the context of water projects, however, should be applicable to some greater or lesser degree to other natural resources development programs which generate change within local groups. The discussion is also confined to impacts on local people[2] since regional assessments are quite commonly made prior to the approval of reservoir projects. While the regional studies have

value in justifying the projects on a broad geographical basis, local impacts are often obscured in regional studies due to an averaging effect. Such a situation is unfortunate since local people often must internalize a disproportionate share of the social and economic costs associated with project implementation.

Social Impact Assessment Research

Many types of social phenomena have been examined by SIA researchers but most of the studies can be subsumed under two broad categories termed social impacts and economic impacts. While these two categories of studies are not mutually exclusive, the typology was adopted to facilitate discussion. Thus, the examination of the existing SIA research will begin with the presentation of an overview of several types of social impacts followed by a brief discussion of economic impacts. The final section of the chapter is devoted to a general synthesis of the materials discussed in the body of the paper.

Social Consequences of Reservoir Development for Local People

Many factors have been examined by SIA researchers in the context of reservoir development but one of the most frequently selected topics for investigation has been attitudes [6,9,10,17,26,27,34-44,47,50-52,54]. Assessments of psychosocial responses to lake construction have been defended on the grounds that attitudes reflect past or expected experiences with the project impacts. It is argued by attitude researchers that individuals who exhibit positive perceptions do so because they anticipate positive consequences or have already received benefits from reservoir development programs.

It is also expected that individuals who anticipate internalizing costs or who have been forced to internalize costs will exhibit negative attitudes. Examination of attitudes, therefore, should provide insight to past experiences with reservoir enduced changes or with anticipated outcomes.

The SIA research findings reviewed for this paper revealed extensive variance and sometimes contradictory findings in terms of attitudes exhibited by local people toward various aspects of reservoir projects and their changed communities. Thus, generalizations made about attitudinal responses to lake projects must be formulated with caution. It is obvious from the literature, however, that geographic factors affect attitudes. People living in arid regions perceive lake projects much more favorably than people living in regions with more abundant rainfall. This finding probably reflects a higher priority being placed on the development of additional water supplies in the more arid regions.

Another generalization which can be made about attitudes toward lake projects is that individual assessments of proposed and completed projects are strongly influenced by costs and benefits encountered by directly affected people. If local people believe they will benefit from a proposed reservoir or previously have benefitted from a completed lake project, they tend to be more favorable [1,9,10,17,21,26,27,30,34-44,47,50,51]. These studies also show that if local people are forced to internalize costs associated with the lake project, they tend to be more negative. It must be observed, however, that positive expectations associated with proposed projects must be realized or local people will become quite negative [21]. Thus, it appears that "vested interests" are quite important in determining the social impacts of reservoir construction for local people.

Napier, et al. [40,41], for example, observed that vested interests variables were the best predictors of the responses of local people to a reservoir project in Ohio. Individuals who benefitted from the project tended to be more favorable than those who did not receive benefits. Research in Kentucky [10,17,26,27,30,51] demonstrated that attitudes toward the various lake projects became more negative as costs increased for local people. Johnson, et al. [27] observed that nearly all of the respondents were negative toward the project studied because they perceived that few benefits would accrue to local residents. Little support can be expected if local people must internalize a disproportionate amount of costs while most of the benefits are enjoyed by people living outside of the directly affected group [9,16,26,27,34,37,51].

Considerable variance has also been shown to exist among local people in terms of benefits and costs expected from lake projects. Downstream farmers, business persons, recreationists and younger people have been shown to favor lake projects because they believed that benefits would be forthcoming to them [51]. Research conducted in Ohio [40,41] confirmed the observation that some people within affected community groups will derive more benefits from lake projects than others. Individuals who received more benefits from the lake project were shown to be more favorable toward the development activity. Singh and Wilkinson [50], Andrews, et al. [2,3] and Bertrand [6], on the other hand, discovered relatively little variance within directly affected groups because nearly all of the respondents were expecting to receive benefits. The Texas data [50] revealed that almost all of the respondents believed that flood control, water supply, and recreation facilities would benefit local residents.

Similar findings were observed in Utah [2,3] and Montana [56]. Bertrand's research [6] in Louisiana revealed that nearly all of the local leaders expressed the belief the proposed lake would generate social and economic expansion in an area which was in dire need of growth stimuli. The leaders supported any type of development activity because the local economy was in a state of decline. The stress caused by economic hardship was perceived to be greater than any adverse social consequences that could be introduced by the lake project. It should also be noted that the largest land owner in the proposed basin area was the federal government which suggests that local people would lose very little privately owned land to the project. This study tends to support the notion that local people exhibit very positive attitudes toward projects which offer potential benefits with little commitment of local resources.

The most surprising findings encountered during the literature review process were those reported by Smith, et al. [52]. An ex post facto assessment of a project in Oregon revealed that local people remained very positive toward the lake project even when the short-run impacts were shown to be very negative. Local people remained quite optimistic that they would benefit from the project eventually even though they had been harmed extensively in the short-run. The belief that benefits would be realized in the future provided the local group with hope they would recover their losses. How long the local people can maintain their optimism without receiving benefits is unknown but the evidence from other research [21] suggests that people will not remain positive for an extended period unless benefits are forthcoming. The Smith, et al. [52] study was conducted shortly after the construction crews had left the area and the economic impacts of recreation had not begun. If the expected economic impacts

of the recreators are not realized, it is highly likely the attitudes toward the project will become much more negative.

While assessments of general attitudes toward lake projects are useful in assessing how local people respond to such development efforts, a much more significant issue for researchers to explore is why local people react in the manner they do. Building on the "vested interests" perspective introduced above, the factors which affect costs and benefits for local people are examined.

Psychosocial Costs of Reservoir Development

One of the most frequently discussed types of social costs associated with reservoir construction is the psychosocial trauma often experienced by directly affected people when lake projects are proposed and implemented [1,4,10,15-17,21,26,26,29,31,34-44,47,48,51,54]. While the sources of trauma vary from group to group, the social consequences of the anxiety and fear are often quite negative for local people. This is especially true for the poor and the aged who are often less able to protect their own interests [4]. The anxiety may be exhibited in a variety of ways such as personal estrangement, deviant behavior, and illness which can have significant affects on people's lives and health. Even though the worst fears associated with reservoir development are more imagined than real [41,43], the expectations of "doom" operate to adversely affect individuals who believe their community will be destroyed. If people believe that many negative things will happen to them, they will exhibit behavior consistent with that expectation even if the belief is not based in fact.

Probably the greatest fear expressed by local people during the pre-construction phases of reservoir projects is the belief that local interaction patterns will become fragmented. Reservoir construction usually

results in the physical relocation of a portion of the resident population and some of these people usually leave the affected area. While much research has documented the desire of displaced people to relocate within the impacted community [1,10,13,13,26,27,34-44,47,48,54], some individuals find it necessary to leave and become physically separated from friends and family living in the affected community. These studies strongly suggest that the ability to relocate close to original homesites and near established friends is a very significant factor in reducing psychosocial stress generated by forced displacement of resident population.

The psychosocial trauma experienced by displaced people does not appear to be directly associated with moving from one house to another but rather is more closely associated with separation from family and friends. Friendships which have been in existence for many years can be disrupted or terminated by physical displacement [10,13,15-17,26,27,34-36,54]. New friendships must be established as the composition of the resident population changes via inmigration of permanent residents. Even the social relationships of local people who are not directly impacted by physical relocation of homes and farms are not immune to the affects of the changes introduced in the local area. Feelings of safety, increased traffic congestion, relocation of highways, and other factors can reduce interpersonal contacts within the changed community.

Evidence that interaction patterns change after reservoir construction has been offered by Donnermeyer and Korsching [13] and by Johnson and Burdge [26]. These authors discovered that local people who were not displaced by the lake project had no trouble making new friends but the respondents reported a reduction in the number of contacts with family and long-established friends. Adler and Hansen [1], however, observed little

change in interaction patterns among local people displaced by a lake project in New England. The relocation strategy used by the development agency in this situation was much different than relocation techniques used in other communities. The local population was relocated en masse to a new site close to the reservoir which made it possible for local people to maintain established interpersonal relationships. This study clearly supports the observation made earlier that establishment of new residences near the original homesites by displaced people can serve to mitigate some of the adverse affects of the disruption. Napier, et al. [34-44] report that social disorganization did not occur even when the affected community was disrupted extensively. The authors suggest that social groups are much more resilient than commonly believed when subjected to significant change forces. Such research suggests that fears expressed concerning the fragmentation of the local social order are grossly overstated.

Closely aligned with physical displacement is the problem of locating comparable housing for people forced to move from appropriated properties. Napier [34], Donnermeyer and Korsching [13] and Korsching, et al. [29] report that many displaced respondents had difficulty locating housing within the affected area. This is not surprising since rural areas frequently do not have available, surplus housing. The Kentucky data [13,29] also demonstrated that displaced people were not satisfied with the new housing when comparable dwellings were located for them. The relocated people complained that the qualitative aspects of the surroundings were not what they desired. Displaced people believed they were entitled to the same quality housing within the same community under "just compensation"

norms associated with the use of eminent domain laws. In essence, the displaced people believed they had the right to remain in the local area and maintain established social relationships even if the federal government had to pay inflated prices for surrounding properties to replace those taken for the lake project. Many people in the Ohio-West Virginia study [34] were quite upset because the development agency did not provide them useful housing information. Later studies [42,43] revealed that attitudes toward land acquisition procedures were influenced by the provision of housing information.

Harsh and impersonal treatment initiated by the development agency personnel has been shown to produce severe psychosocial stress for local residents [34,39,42,43,47-49]. Negative attitudes toward lake projects and personal stress appear to be a partial function of the intrusion of external change agents into the lives of local residents. These feelings are compounded when the change agents have the power to employ eminent domain laws to secure private properties which frequently have been in the possession of the same families for many generations. Not only do local people react adversely to the appropriation of private property, they also resent the use of government power to secure the lands. Local people respond negatively to agency personnel who are insensitive to human sorrow during the land acquisition phase of the project. Lack of sensitivity during the procurement of condemned properties and the relocation of the living and the dead is a major source of psychosocial pain for local people.

The SIA literature is replete with documentation of negative attitudes toward implementation policies of reservoir development agencies [13,14,21, 29,31,34-44,47,48,51,54]. The SIA literature suggests that more humanistic

treatment of displaced people and more care taken when cemeteries are relocated would be rewarded with more positive acceptance of the development action. Napier and Moody [42,43] demonstrated, for example, that attitudes toward land acquisition policies were the best predictors of attitudes toward the project. When local people perceived the land acquisition policies and procedures to be equitable, there was a more favorable attitude toward the lake project. When perceptions of land acquisition were negative, the corresponding attitudes toward the lake project became very negative. These findings suggest that procedures used in the early phases of project implementation are crucial in affecting how the resultant lake project will be received.

Fear that "outsiders" will change the affected community can generate considerable psychosocial stress among directly affected people. Local people often express concern that the social milieu will change to the point that it will no longer be capable of satisfying the social needs of local people. Long-term residents believe that outsiders will change the social relationships of local people and modify accepted patterns of behavior via importation of different values, beliefs, attitudes and behavioral practices. Evidence from research suggests that some of these concerns have basis in fact while others are considerably overstated. Ex post facto research conducted in Ohio, using a longitudinal research design, revealed that fragmentation of the local social order did not occur even when hundreds of thousands of recreators were attracted to the community each year and the number of permanent residents doubled in 10 years [34-44]. Other studies [20,52] have also demonstrated that extensive population changes should be expected when reservoirs are constructed. The population

changes begin when local residents are relocated from the basin area. Subsequent changes occur when construction crews and their families arrive. The last group to impact local residents are permanent inmigrants who are attracted to the reformulated community by leisure-time activities. Each of these population influences has a different but significant effect on the local group.

The Ohio data [34-44] clearly show that most permanent inmigrants were quickly assimilated into the reformulated social networks and were rapidly accepted by the long-term residents living in the affected community. The findings demonstrate that recent inmigrants did not adversely affect the social cohesiveness of the local group. Data from Kentucky, however, revealed that considerable psychosocial stress was introduced into displaced people's lives by "scavengers" who came from outside the affected community group. The "scavengers" stole many valued antiques from the unprotected homes of people who were in the process of being relocated. The "scavengers" apparently believed the homes and antiques had been abandoned and proceeded to steal and vandalize property. Lack of police protection resulted in considerable economic loss for displaced people but also resulted in severe psychosocial trauma. The stress was greatest for the aged who could not understand why people would take cherished family relics.

Recreators are another source of disruption for local people [15-17, 34-44,48]. Napier and Bryant [37] have even suggested that recreator enduced impacts are the most disruptive of all change producing stimuli associated with reservoir development. They note that recreator impacts begin soon after the initiation of lake construction and frequently continue

for decades. Physical relocation, on the other hand, is often completed within a very few months. While the trauma associated with physical relocation is not confined to the time period of actual displacement and resettlement, the probability is quite high that affected people will never be physically displaced again and can begin the accommodation process immediately after the relocation has been completed. Recreator impacts, however, occur repeatedly and may actually increase in magnitude over time.

Some of the most significant recreator impacts are associated with interpersonal behavior and inconsiderate actions. Litter, trespass, verbal abuse, excessive alcohol consumption, speeding violations, public displays of affection, vandalism, and invasion of privacy are some of the individual behaviors that local people resent and fear [15,34-44,48]. Each of these deviant acts serves to alienate local people from recreators even though most local people recognize that only a small minority of recreators are responsible for the negative acts [48].

Recreators also disrupt the lives of local people by their very presence in the community. Traffic congestion during the recreation seasons can impede use of local highways by residents [15,17,21,40,41]. Restricted access to local roads is a serious problem for farmers who must move machinery from field to field and transport their grain to market. Noise pollution [21,40,41] generated by recreators using large power boats and by individuals engaged in other outdoor recreation activities serves to disrupt the tranquility of rural environments. People pollution also makes it very difficult to locate a place to be alone [40,41]. These factors affect the aesthetic qualities of the rural lifestyle of local people and cause stress for local inhabitants.

The disruption of or reduction in quality of local public services can produce stress for directly affected people. Johnson, et al. [27] and Johnson and Burdge [26] observed that disruption of services during the construction phase of projects can produce stress for local people. Access to public services such as highways can be disrupted for extended periods of time and create many inconveniences for local people. Access to highways by local people may also be impeded by recreator use during the recreation season. A public service that is often eroded in quality as a result of lake construction is police protection which frequently leads to greater fear being exhibited by local people. Several studies have shown that local crime rates increase when lake projects are implemented which places an additional strain on already over-extended control agencies [15,21,31, 38,41,47,48,54]. Considerable fear can be generated by criminal acts being committed in the local community by outsiders who are attracted by the lake project. Fear of criminal acts can result in constrained movement within the affected community after dark. Recreators frequently frighten local people unintentionally when they pass close to occupied residences while traveling from parking areas to the recreation sites. Napier, et al. [40,41] report that encounters with criminal acts not only affects perceptions of personal safety but also perceptions of the lake project and the type of development programs local people would like to see implemented.

While negative impacts on public services have been documented repeatedly in the social impact assessment literature, some evidence suggests that certain types of public service facilities are improved by reservoir construction. Napier and Moody [42,43] note that lake construction resulted in the improvement of local highways and other service infra-

structures within an impacted community in Ohio. The public service facilities which were in existence prior to lake construction were dismantled or abandoned. The newly constructed public facilities are qualitatively far superior. While the highways have been extensively used by recreators and local people for several years, little deterioration has occurred and road repair has not yet created a financial burden for local residents. The highways built during the construction phase of the project are still in excellent condition. Dwyer, et al. [21], however, observed rapid deterioration of highways near a large project in Illinois and documented the political rebellion of local people when it became necessary to finance repairs. Local people had become so stressed by outsiders that they decided not to pay for road repairs in hopes the poor roads would discourage recreator use. Research conducted in Oregon [52] revealed that the expansion of public services to accommodate resident construction workers caused considerable stress to local people once the workers left. The problem was not deterioration of quality but excess capacity. Local people became very concerned about how they would pay for the expanded public services which were suddenly not fully utilized.

A factor shown to be of considerable importance in the explanation of psychosocial stress associated with lake projects is the lack of definitive time schedules for project implementation and completion. The SIA literature is quite consistent on this issue [17,29,31,34,42-44,51] and shows that local people are frequently stressed by the uncertainties associated with the authorization and implementation of water projects. The data suggest that development agencies could significantly reduce psychosocial stress by informing local people when the project will be initiated, how much land will be acquired and which parcels of land will

taken. Without having this type of information local people are not able to make future plans. The research findings indicate that definitive time tables associated with forced movement are preferable and more easily accepted by local people than uncertainties about the status of the project. These studies strongly suggest that water resources agencies should establish firm time frames and abide by them when introducing a lake project.

Economic Benefits of Reservoir Development

The existing SIA research strongly suggests that the types and magnitude of economic benefits generated by reservoir development are very important in determining how the project will be perceived by local people. Many local residents believe that proposed reservoir projects will prove to be a panacea for existing problems of socio-economic growth and strongly support such development efforts [6,12,50,52]. Other people within directly impacted communities strongly believe that lake projects will not produce economic growth [9,10,21,26,27,30,34,36,51] and tend to oppose them. Ex post facto assessments of reservoir impacts usually show that the economic consequences of lake projects for local people are quite varied and sometimes quite negative. Several studies [21,24,34-44], for example, have demonstrated that few economic benefits accrue to local people except increases in property values [6,14,16,17,25,28,34,39,41].

Inflation of local property values has been shown to have both positive and negative impacts for local people. The increases in property values are undoubtedly beneficial to local land owners and have resulted in some land owners becoming very wealthy via windfall profits. Land that has been previously valued in terms of agricultural use frequently is reassessed in the context of residential or leisure-oriented uses which are valued at

much higher prices. Increases in property values can have a very positive effect on local people in terms of financing existing or expanded community services. Since publicly owned land is not subject to taxation via intergovernment agreements, local tax revenues can be substantially reduced as a result of taxable properties being removed from tax rolls. The adverse effects of tax revenue losses due to appropriation of private properties for lake development can be negated, however, by increases in local property values. Bates [5] observed, for example, that adverse impacts of reservoir development on funding for local school systems and other public services were not realized even though they were expected because local land values increased and subsequently generated larger tax revenues than projected. Thus, increased property values compensated local people for inflated tax burdens which they would have been required to internalize without the increases in property values. It should be noted that federal development agencies engaged in reservoir development are required to subsidize local school systems for a period of time to compensate for loss of local tax revenues and it is highly likely that the Bates' [5] findings partially reflect this economic support at least during the initial period of adjustment to the tax losses.

The negative effects of inflated land values are primarily confined to the physically displaced members of the affected community. Since it has been shown that most displaced people prefer to relocate within the affected community boundaries, they must pay the inflated prices for available homesites and existing housing. Such payments frequently place displaced people in an economically disadvantaged position. While displaced people may receive "fair market value" for appropriated properties, the increases in property values within the affected community serve to

force many displaced people to leave the area. The problem of securing comparable properties to those taken by the State is compounded for displaced farmers who require large tracts of land to remain in production agriculture.

While the impacts of inflated property values are easily identified, resolution of the problem is much more complex. Local people interpret "just compensation" to mean they will receive a fair market price for their appropriated lands which is adequate to permit them to relocate within the affected community. Unfortunately, fair market values of appropriated lands are assessed prior to the inflation of surrounding properties and in terms of use at the time of the assessment which means that compensation for properties taken by the project may not be adequate to purchase comparable properties within the affected community. Since agricultural lands are not assessed as high as residential or other uses, farmers particularly will be harmed by reservoir development. The adverse effects of inflation of surrounding properties is further complicated when the development agency attempts to secure condemned properties below market prices [14,26]. Such a situation compounds the economic suffering of directly affected people. Given these circumstances, it should not be surprising that SIA research has shown that many people feel that lake projects create considerable economic problems for them [1,14,26].

Reservoir construction can be an important stimulus for the expansion of local businesses as a result of construction workers and their families being attracted to a reservoir work site [20,52]. Imported construction workers and their families require a wide range of goods and services which can be provided in the local area when the economic infrastructure is expanded. Housing needs of construction workers must be met which often

creates an expansion of the local building industry [20] since available housing is often lacking in rural communities.

The economic benefits of reservoir development for local people may be short-lived due to outmigration of construction workers when the project is completed [52]. The economic "boom" and "bust" experienced by many reservoir impacted groups is not inevitable, however. Bates [5] and Napier and Moody [43] note that few adverse economic impacts were observed in directly affected communities when construction workers lived outside of the community being impacted by the lake project. Other than some minor inconveniences due to congestion of local highways due to commuting of construction workers, there are usually very few economic impacts for local people when workers live elsewhere. Napier and Moody [43] posit that one of the reasons why social relationships were not adversely affected within the study group was due to construction workers living in adjacent urban communities. These researchers observed that local people were not required to provide expanded public services or to incorporate the workers and their families in reformulated interaction systems.

Dunning [20] documented the magnitude of inmigration of construction workers using national data. He discovered that approximately 30 percent of all lake construction workers are imported from communities outside of the affected area. Most of the imported people are highly skilled personnel who locate relatively close to the construction site to have ready access to the project. The management-type personnel who are most frequently imported have been employed to implement the project and proceed to do so as quickly as possible. In essence, they are concerned about meeting contractual agreements and are not particularly concerned about

humanistic considerations which affect local acceptance. The impersonal orientation of management personnel may explain the reaction of local people to harsh and impersonal treatment by construction crews and land acquisition agents noted earlier in this chapter.

Ex post facto assessments of economic impacts often demonstrate that expected benefits associated with lake projects are often not achieved. Two of the most important explanatory factors associated with why expected economic benefits are not received by local people are over-estimation of recreation user days once the lake has been created and the inability to predict the magnitude of expenditures made in the local community by the recreators who visit the project. Outdoor recreation development has been shown to generate few economic benefits for local people [7,8,53,57]. When lake projects are located near urban communities and are primarily visited by day users, the economic impact for local community groups are almost certain to be quite small. Recreationists usually bring their consumable goods with them and make few purchases in the local community. If recreators do not make purchases in the local community, then local economies cannot benefit from increased recreation activities. A major exception to the studies noted above was reported by Garbacz [22] who investigated a lake project in the Ozarks. A possible explanation for the economic benefits received by local people in Garbacz's study [22] is the ecological location of the project. The lake is located many miles from an urban area which means that recreationists are forced by circumstances to make purchases in local communities.

Another factor that contributes to unrealistic expectations of local economic growth is the over estimation of recreation user days made during the planning phases of the project. Many times the estimated

user days are never achieved. Gramann [23,24] supports this position when he notes that local economic benefits were not achieved in Illinois because the number of recreators never reached the projected level. Evaluation of sales within the impacted area of the Illinois project revealed some increases in retail sales in two of the larger towns located close to the reservoir but the actual sales were not of the magnitude expected. Practically no change in retail sales were observed in the other towns located in the impacted area [33] and it is highly likely that the small increases in economic activity were negated by the investments made in public services [21,33].

The regional variations associated with social impact research noted in the introduction of this paper are easily observed in the ex post facto assessments of economic impacts. Andrews, et al. [2,3] demonstrated that expanded supplies of water for irrigation were perceived by Utah residents to benefit nearly everyone in the area. Agricultural production was shown to increase about 26 percent as a function of irrigation water being made available. Trock [55] discovered similar findings in Texas where he observed that expanded water supplies resulted in the expansion of agricultural activity primarily in the production of cattle. This was contrary to predictions made that row crops would be expanded due to flood control and water supplies being made available by the lake project. Trock's study [55] was strongly supported by Mattson [32] who examined 60 small watersheds in the southeast, the Missouri Valley and the Mississippi Valley. The findings demonstrated that flood control did not result in major expansion of agricultural production of row crops in the flood plain. He attributed the lack of row crop agriculture in the flood plain to prohibitive costs of putting marginal land into agricultural production.

The study demonstrated that the reservoir projects had resulted in more of the flood plain being used for unimproved pasture and forests. These findings [2,3,32,55] bring into question the belief that reservoir development programs will result in major land use shifts to agricultural production. Mattson's findings [32] strongly suggest that factors other than safety from flooding are involved in agricultural production decision-making. The construction of a reservoir simply offers the farmer who owns flood plain land an option which he/she did not have before the lake was constructed.

While reservoir development has been shown not to enhance row crop agriculture in the protected flood plain, there have been studies which have documented other types of land use changes which have significant economic implications. Napier, et al. [40,41] report that land use has been changing in the reservoir impacted community and it is changing from production agriculture to residential uses. The changes have resulted in significantly higher land values and the outmigration of farmers. Napier, et al. [39,40] predict that farming will soon cease to be a viable component of the economic infrastructure of the affected area. Prebble [46] also observed significant land use changes and noted that development of recreation cottages began to immediately transform local land use patterns near a major reservoir. These findings indicate a shift from agricultural and extractive industries to leisure oriented economic activities. Prebble [46] also observed that the settlement patterns around the lake will create severe economic problems for the local group when public services must be provided in the future. Napier, et al. [41] recognized the same problem and posited that provision of central water and sewage treatment facilities will be extremely costly in the future as

a result of strip-development. Opryszek [45] observed a shift in land use from agricultural to recreational uses but noted little residential development. Given the fact that recreational activities usually do not produce extensive economic growth, it appears the loss of agricultural production will not be compensated by recreational spending. Thus, the economic studies reviewed strongly suggest that reservoir development does not necessarily result in economic growth and expansion. In fact, the study findings reported here suggest that local groups probably are harmed to some extent economically when all costs are considered.

Accomplishments of SIA Researchers

The SIA research reports reviewed in this chapter demonstrate that reservoir projects generate extensive changes within directly affected community groups. The studies also show that social scientists have made significant contributions to existing knowledge bases in the field of social impact assessment. Social scientists have examined many important issues while conducting SIA research and have made substantial contributions to the understanding of the social processes which are operative within directly affected groups when reservoir projects are implemented. Several of the most important sociological issues investigated by contemporary SIA researchers interested in reservoir development are: the psychosocial stress created when physical displacement separates friends and family, the anxiety generated by the intrusion of "outsiders" into the lives of local people, the consequences of population changes produced by construction workers and by permanent inmigrants, the psychosocial stress produced by visitors to the lake projects, the anxiety generated among

local residents when land acquisition agents employ harsh treatment, the disruption of local public services by project construction, the expanded demands made on public services by construction workers and recreators, the increased crime rates within impacted communities and the corresponding decline in the feelings of personal safety of local residents, the disruption of the tranquility of the rural setting by construction activity and by recreator uses, the disappointments associated with expectations of socio-economic growth which are never realized, and the anxiety generated among local people by the lack of definitive time tables for project implementation. Research efforts which contribute to resolving these problems are important research endeavors.

Some of the most important economic issues examined by researchers interested in reservoir impact assessment are: the consequences of increases in local property values, the impacts of inadequate compensation for properties appropriated by the development agency, the problems associated with financing expanded public services, the economic problems created by "boom" and "bust" situations, the distributional aspects of expenditures made by recreators in local communities, the changes in economic activity in the restructured community, the economic consequences of land use changes in the area surrounding the lake project and in the protected flood plain, and the problems associated with financing future services within communities which do not control the patterns of residential development. These topics are relevant to problem resolution and are also worthy research issues.

The SIA research findings reviewed in this chapter basically indicate that local groups are significantly impacted by reservoir development and show that considerable variance exists in terms of the local group's

reactions to the changes. A very important finding produced by SIA researchers is that anticipated consequences of reservoir development are often never realized. Local people who are convinced that significant economic growth and expansion of the socio-economic infrastructure will occur are probably destined to be disappointed. Individuals who fear the local social milieu will be destroyed are probably creating their own purgatory because the evidence suggests that severe adverse consequences will not be experienced. The evidence strongly suggests that social groups are adaptive to extensive change stimuli and are able to accommodate many types of changes introduced by reservoir development. Such an interpretation of the SIA findings should not be construed as suggesting that adverse social impacts should be ignored because the authors of this paper contend that each negative impact should be carefully studied, plans to solve the problem should be conceived, and corrective action taken. We argue that it is unfair for an institutional representative of the society to expect local people to sacrifice for the common good when it is not necessary to do so. Equity issues demand that all adverse impacts should be mitigated within reason.

It is the contention of the authors of this paper that all of the issues noted above can be solved by carefully conceived action. Most of the problems identified in the literature are either associated with the implementation procedures employed by the development agency, the lack of future planning by the local community group, or the ignorance of actual reservoir impacts by local people and the agency personnel. To be successful in solving the problems identified by SIA researchers, it will be necessary for local people and the agency personnel to work together.

There is no longer any excuse for either group to operate independently of the other because the data strongly suggest that knowledge possessed by one of the actors is essential for the other to fulfill its role in the planning process.

Social scientists who are competent in social impact assessment could effectively serve as consultants in the decision-making process by providing information to both parties concerning important social issues. Even with the limited SIA knowledge base we presently possess, much can be stated about the consequences of reservoir development.

The major obstacle to cooperative efforts is trust. Local people usually do not place much confidence in agency personnel and the agency staff often view involvement of local people in the planning process with disdain. These attitudes must be changed if cooperation is to be achieved. It is ironic that the major impediment to good planning is the very issue that must be resolved before cooperation can be achieved. Until the parties in the planning process become committed to cooperative efforts, an adversary role will always be assumed when reservoir projects are proposed.

When the two parties are engaged in conflict, the role of social scientists is changed drastically. The scientist may align himself/herself with one of the combatants and become an advocate or conduct research and publish results in the standard professional outlets. In either event the utility of the scientist in the planning process is seriously curtailed.

FOOTNOTES

1. Much of the literature cited and the concepts discussed in this paper were reviewed and encorporated in two studies conducted by the authors under the auspices of Hatch 375 and Hatch 645 administered by the Ohio Agricultural Research and Development Center, Wooster, Ohio. The authors wish to thank Lyndal K. Napier for secretarial support during the writing of this paper.

2. Local people refers to individuals living in close proximity to the lake project. Interaction boundaries are used to formulate the concept of "community." Thus, individuals living close to reservoir projects and participating in local interaction networks are defined as "directly affected groups."

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